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Nutritional Profile and Multiple Sclerosis in a Cohort of Portuguese Patients

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Nutritional Profile and Multiple Sclerosis in a Cohort of Portuguese Patients

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Dedicatória

Aos meus pais, que são a base da minha formação pessoal e académica;

À Rita, a minha maior conselheira, por sempre me apoiar e fazer-me sentir em casa;

Ao David, pelo suporte e disponibilidade incondicionais.

Nutritional Profile and Multiple Sclerosis in a Cohort of Portuguese Patients

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Abstract

Background: The research on health behaviours of multiple sclerosis (MS) patients has been intensified in the last years. The proposal is to identify and intervene on modifiable factors, such as physical activity, weight control and dietary habits to delay disability and improve overall quality of life.

Objective: This study aims to evaluate associations of dietary habits, body mass index (BMI) and body composition with the Expanded Disability Status Scale (EDSS).

Material and methods: We investigated a cohort of 37 Portuguese adults with relapsing MS onset. They performed a nutritional evaluation, including food intake frequencies, height, weight and body composition [percentages of total body water (%TBW), soft lean mass (%SLM), fat body mass (%FBM) and phase angle], and were asked about their smoking status and physical activity. We also assessed demographic information and MS characteristics, including EDSS.

Results: Seventeen (45.9%) patients were overweight or obese, but there was no statistically significant correlation between body mass index (BMI) and EDSS. Patients with higher EDSS had significantly lower phase angle (p=0.003), %TBW (p=0.024) and %SLM (p=0.024), as well as greater %FBM (p=0.025). Weekly intake of alcoholic beverages had a negative correlation with EDSS (p=0.006). There was also a significant negative correlation between EDSS and physical activity level (p=0.002).

Conclusions: We hypothesize that neurological disability leads to deleterious changes in body composition of MS patients. The %FBM seems to be a better marker of the risk of comorbid-health conditions than BMI in MS patients and phase angle appears to have a considerable correlation with disability progression. We cannot conclude about the effective impact of dietary habits on MS course.

Keywords:
Multiple sclerosis
EDSS
Nutrition
Body mass index
Body composition
Phase angle

1. Introduction

Multiple Sclerosis (MS) is a progressive autoimmune-mediated disease but its cause still unknown. Previous research suggests that MS has a multifactorial nature, with involvement of genetic, immunological and environmental factors in a complex aetiology [1-4]. The environmental risk factors most associated with MS are low vitamin D status, prior infection with Epstein-Barr virus and tobacco smoking [2,3,5-8]. Tobacco smoking also seems to have a negative impact on MS progression [9,10].

Although there are disease-modifying therapies that slow disease progression and prevent some symptoms, MS therapeutics remain limited and the disease leads to a progressive disability and a reduced quality of life [2,6,11]. In the past years, the investigation on health behaviours of MS patients has been intensified trying to identify and intervene on modifiable factors that could delay disability and improve the overall quality of life.

Physical activity probably generates important outcomes in MS patients, with both physical and mental improvements. Animal studies also suggest neuroprotective benefits. Unfortunately, a disease-modifying effect of physical activity in MS patients cannot be surely affirmed given the limited strength of evidence and the heterogeneous findings [12-14].

Studies have shown that a large body size during adolescence and young adulthood was associated with an increased risk of MS [7,15,16]. The pathophysiological mechanisms suggested seem to be complex, including change on adipokines' secretion and higher prevalence of vitamin D deficiency among obese subjects. Data from experimental models suggested a negative impact of obesity in MS course and prognosis, but clinical investigation remain limited [17]. Some studies showed that prevalence of overweight or obesity is around 50% in MS patients with established diagnosis or at MS onset [18-21]. Interestingly, patients with significant disability are likely to have higher proportion of underweight [19,22,23].

The prevalence of fatigue and impaired muscle and movement functions is very high among MS patients [11] and there is no doubt that physical activity decreases steadily with disability progression [14,18,19]. Along with the possible abnormalities in skeletal muscle [24], these patients seems to have an increased fat mass and a reduced lean mass in the lower limbs [24,25]. However, studies reporting body composition of MS patients are limited and no association has been stablished with their disability progression.

Currently, there is no direct evidence indicating a crucial role of nutrition in MS aetiology or progression. In the last years, the increasing amount of research shows the crescent interest in dietary habits as an important target in these patients [1,2].

Omega-3 long-chain polyunsaturated fatty acids (n-3 PUFA) found in fish may be beneficial due to their neuroprotective, anti-inflammatory and immunomodulatory effects [1-3,6,22,26]. Some authors suggested that n-3 PUFA enriched diet is helpful as a complementary

Abbreviations: CHSJ, Centro Hospitalar São João; EDSS, Expanded Disability Status Scale; FBM, fat body mass; IPAQ, International Physical Activity Questionnaire; MRI, magnetic resonance imaging; MS, multiple sclerosis; n-3 PUFA, omega-3 long-chain polyunsaturated fatty acids; NHANES III, third National Health and Nutrition Examination Survey; PA, phase angle; SLM, soft lean mass; TBW, total body water; %FBM, percentage of fat body mass; %SLM, percentage of soft lean mass; %TBW, percentage of total body water.

treatment to MS. This idea is supported by experimental studies, but clinical trials are inconclusive [1,6]. Other bioactive molecules frequently studied are polyphenols (found in vegetables and fruit) and carotenoids (mainly found in vegetables). Since oxidative stress is considered one of the most critical processes implicated in demyelination and axonal damage, these anti-oxidative substances could have a role in disease modulation. One of the most important polyphenols is resveratrol, that is found in nuts, some fruits and wine, which seems to have neuroprotective effects [2,3].

It has been suggested a promising effect of specific consumptions, such as caffeine [26,27] or alcohol [7,26,28] in MS progression. On the other hand, some eating habits seems to have a negative association with MS, including high intake of animal fat, smoked meat products, sugar, sweets, sweetened beverages or cow milk [2,3,5].

Available data is still limited to make specific dietary recommendations for MS improvement and there are few studies on dietary intake habits and body composition of MS patients. In the present study, we aim to assess health behaviours in a cohort of Portuguese MS patients and analysed their association with MS status. Our primary goal is to evaluate the associations of dietary habits, body mass index (BMI) and body composition with the MS disability scale. We also intend to evaluate the impact of smoking status and physical activity.

2. Methods

2.1. Study Population and Data Collection

The study population included adult patients with MS diagnosis followed at the Neurology Department of Centro Hospitalar São João (CHSJ). MS diagnosis was established according to McDonald criteria [29]. At the time of their visit to neurology outpatient clinic between January and June of 2015, patients were asked to participate in the study and provided informed consent. After that, patients were guided to the nutrition unit of CHSJ to perform a nutritional evaluation and assess anthropometric and body composition measures. The nutritional evaluation was obtained through a face-to-face interview conducted by a nutritionist.

The following data was collected from each patient's interview: daily intake frequency of cow milk and/or yogurt, coffee, fruit, vegetables and weekly intake frequency of nuts (such as peanuts, almonds, pine nuts and walnuts), meat, fish and alcoholic beverages. We also asked the patients about their smoking status and classified them as never smoker, current smoker or former smoker. Physical activity was recorded using the short form of the International Physical Activity Questionnaire (IPAQ) and classified as low, moderate or high [30].

The anthropometric measures assessed were height (self-reported by each patient) and body weight (assessed with light clothing, without metal accessories nor shoes). We calculated their BMI by dividing weight (in kilograms) by height (in meters) squared and categorized it by Word Health Organization classification: <18.5 kg/m^2 is considered underweight, 18.5 to <25

kg/m^2 normal weight, 25 to <30 kg/m^2 overweight and ≥30 kg/m^2 obese. The body composition of each patient was obtained by the body composition analyser InBody720® (Direct Segmental Multi-frequency Bioelectrical Impedance Analysis Method) and the values of total body water (TBW), in litres, soft lean mass (SLM) and fat body mass (FBM), in kilograms, were extracted to our database. The percentages of TBW (%TBW), SLM (%SLM) and FBM (%FBM) were calculated by dividing each absolute value by total weight. One patient didn't fulfil this evaluation due to physical limitations. The phase angle (PA) was calculated directly from reactance and resistance. It represents a measure of cellular health and correlates with nutritional and functional status [31].

In medical records we assessed demographic information and MS characteristics, including year of diagnosis, relapsing or progressive disease onset, immunomodulatory drugs used, results of the last magnetic resonance imaging (MRI) scan (presence or absence of black holes and presence or absence of gadolinium-enhancing lesions) and neurological disability using the Expanded Disability Status Scale (EDSS) [32].

2.2. Statistical Analysis

Data were analysed using IBM® SPSS Statistics for Windows, version 23.0 (Armonk, N.Y., USA: IBM Corp.). Kolmogorov-Smirnov test was used to assess normality. As all cardinal variables were non-normal distributed, the analysis was based on non-parametric tests.

Descriptive statistics are presented as absolute (*n*) and relative (%) frequencies for categorical data or medians and percentiles 25th (P25) and 75th (P75) for quantitative data. Spearman's correlation coefficient (*rs*) was used to measure the association between pair of quantitative variables and Mann-Whitney test was performed to compare mean ranks of two independent samples. Values of $p<0.05$ were considered statistically significant.

This study was approved by the ethics committee of CHSJ, Porto, Portugal.

3. Results

3.1. Study population characteristics

A total of 37 adult MS patients were included. All patients were white, most of them were women (81.1%), with a median age of 37.5 years and median time since MS diagnosis of 5 years. All patients had a relapsing disease onset, with median EDSS of 1 and only two patients had no immunomodulatory treatment. More than one-half (55.6%) of the patients had black holes and 7 (19.4%) patients had gadolinium-enhancing lesions on the last MRI scan. Additional information is showed in Table 1.

3.2. Smoking status and physical activity

About two-thirds (66.7%) of patients have never smoking and 7 (19.4%) patients were current smokers (Table 1). No significant association was found between smoking status and EDSS (Table 2). Less than one-third (28.6%) of patients reported low physical activity and 20 (57.1%) patients reported moderate physical activity (Table 1). A statistically significant negative correlation (p=0.002) was found between EDSS and physical activity level (Table 3).

3.3. BMI

Twenty (54.1%) patients were normal weight, 12 (32.4%) overweight and 5 (13.5%) obese (Table 1). There was no statistically significant correlation between EDSS and BMI (Table 3).

3.4. Body composition

The medians (P25; P75) of TBW, SLM, FBM and PA by sex are showed in Table 1. Patients with higher EDSS had significantly lower %TBW (p=0.024), %SLM (p=0.024) and PA (p=0.003), as well as greater %FBM (p=0.025) (Table 3).

3.5. Food intake frequencies

Only the frequency of alcoholic beverages intake had a statistically significant negative correlation with EDSS (p=0.006) (Table 3).

Table 1

Demographic and clinical characteristics of study population.

Sex [n (%)]	
Female	30 (81.1)
Male	7 (18.9)
Age - years [median (P25 ; P75)]	37.5 (27.7 ; 47.3)
Time since MS diagnosis - years [median (P25 ; P75)]	5 (1 ; 10)
Immunomodulatory treatment [n (%)]	
Interferon beta-1b	9 (24.2)
Interferon beta-1a	14 (37.8)
Glatiramer acetate	3 (8.1)
Fingolimod	2 (5.4)
Natalizumab	5 (13.5)
Fampridin	1 (2.7)
Teflunomide	1 (2.7)
No treatment	2 (5.4)
EDSS [median (P25 ; P75)]	1.0 (0.0 ; 2.5)
Last MRI scan [n (%)]	
Gadolinium-enhancing lesions	
Present	7 (19.4)
Absent	29 (80.6)
Black Holes	
Present	20 (55.6)
Absent	16 (44.4)
Smoking status [n (%)]	
Never	24 (66.7)
Current	7 (19.4)
Former	5 (13.9)
Physical activity [n (%)]	
Low	10 (28.6)
Moderate	20 (57.1)
High	5 (14.3)
BMI categorization [n (%)]	
Normal weight	20 (54.1)
Overweight	12 (32.4)
Obese	5 (13.5)
TBW - litres [median (P25 ; P75)]	
Female	30.3 (27.9 ; 32.1)
Male	42.8 (41.3 ; 43.5)
SLM - kilograms [median (P25 ; P75)]	
Female	38.8 (35.8 ; 42.3)
Male	55.0 (53.2 ; 55.9)
FBM - kilograms [median (P25 ; P75)]	
Female	22.3 (16.5 ; 29.0)
Male	10.8 (6.9 ; 21.1)
PA [median (P25 ; P75)]	
Female	5.1 (4.7 ; 5.6)
Male	6.1 (5.5 ; 6.7)

Table 2

Characterization of EDSS according to smoking status (Mann-Whitney test).

Variable	EDSS [median (P25 ; P75)]	*p*
Smoking status (*n*=36)		
Never	1.0 (0.0 ; 2.5)	0.693
Current or former	1.0 (1.0 ; 3.4)	

Table 3

Spearman's correlation coefficients (*rs*) between EDSS and physical activity, BMI, body composition parameters and food intake frequencies.

Variable	EDSS [*rs* (*p*)]
Physical activity (*n*=35)	-0.513 (0.002)
BMI (*n*=37)	0.271 (0.104)
%TBW (*n*=36)	- 0.376 (0.024)
%SLM (*n*=36)	- 0.376 (0.024)
%FBM (*n*=36)	0.373 (0.025)
PA (*n*=35)	- 0.488 (0.003)
Daily frequency intake:	
Cow milk and/or yogurt (*n*=37)	- 0.011 (0.947)
Coffee (*n*=37)	0.026 (0.877)
Fruit (*n*=37)	- 0.225 (0.181)
Vegetables (*n*=37)	- 0.019 (0.911)
Weekly frequency intake:	
Meat (*n*=35)	- 0.231 (0.182)
Fish (*n*=35)	- 0.111 (0.526)
Nuts (*n*=35)	- 0.100 (0.567)
Alcoholic beverages (*n*=36)	- 0.449 (0.006)

4. Discussion

This study is one of the few studies presenting an overview of dietary habits and body composition in MS patients, as well as their associations with EDSS. We have also complemented the evaluation of health behaviours assessing physical activity and smoking status.

Our sample presented a slightly less frequency of overweight and obesity among MS patients (45.9%) when compared to previous studies, which showed prevalence between 47.5% and 56.3% [18,19,21]. Although the considerable prevalence of overweight and obesity, a prospective study including 269 individuals with relapsing-remitting MS suggested that BMI had minimal impact on disability progression [21]. In agreement with those results, we found no significant association between BMI and EDSS. The association between BMI and MS disability status remains unclear. An unsolved question is whether the high prevalence of overweight/obesity in these patients develops independently or due to MS or its specific treatments. However, our results highlight the importance of weight status evaluation in these patients given the percentage of BMI values exceeding values recommended for health.

A study evaluating BMI and body composition in MS patients concluded that BMI threshold for obesity has a high specificity but underestimates true adiposity when compared to the percentage of body fat-defined obesity [33]. If we stratified our results of %FBM according to the values widely use as reference to define obesity (FBM ≥ 25% for men and ≥ 35% for women) [34], the proportion of patients classified as obese increase over 30% when compared to BMI classification (44.4% *vs.* 13.5%). These results may alert physicians to the importance of body composition evaluation as a marker of potential comorbidities' risk, such as cardiovascular disease, and reduced health-related quality of life even in patients with BMI < 30 kg/m^2.

Previous research evaluating body composition found no significant differences between the %FBM of MS patients when they were compared with controls. There was no significant association between disability scales and components of body mass composition [25,35,36]. In contrast to those studies, we found a significant association between EDSS and %TBW, %SLM and %FBM. Patients with higher EDSS had significantly lower %TBW, lower %SLM and higher %FBM. These results suggest that neurological disability must lead to deleterious changes in body composition, increasing the risk of comorbid-health conditions.

Since we didn't have a control group, body composition parameters were compared with standardized values for sex and age groups described in population-based data from the third National Health and Nutrition Examination Survey (NHANES III) [37]. This comparative analysis intends to give us an estimate of how our sample approaches population standards. However, its interpretation may be limited because standard values proposed by NHANES III are not necessarily applicable to Portuguese population. Most of participants (75%) presented TBW (in litres) and FBM (in kilograms) within the 95% confidence intervals showed in NHANES III.

Interestingly, 29 participants (82.9%) have a PA below the 95% confidence interval showed in NHANES III. Individuals with chronic diseases frequently present a lower PA than healthy subjects due to the influence of parameters like infection or inflammation [31]. Therefore,

the lower PA in most of our patients may reflect the disease negative effect on this parameter. Previous studies reported a predictive effect of PA on prognosis of several diseases (mortality and disease progression) [31]. For example, a study conducted on patients with amyotrophic lateral sclerosis showed that lower values of PA were significantly associated with shorter six-month survival [38]. In our study, PA was significantly lower in participants with higher EDSS, bringing up the question of a possible relationship between PA and disability in MS patients.

We found a significant association between EDSS and the frequency of alcohol consumption. The impact of alcohol consumption in MS is controversial and the information about alcohol use among MS patients is limited. In our study, patients with lower EDSS reported a significantly higher frequency of alcoholic beverages intake. This finding is supported by a large study in relapsing onset MS patients that reported an inverse association between alcohol consumption and the risk of reaching EDSS 6 [26]. Furthermore, moderate consumption of alcoholic beverages seems to have a potential anti-inflammatory effect due to ethanol's properties on reducing pro-inflammatory cytokines synthesis or monocyte inflammatory responses [39]. Although we cannot exclude reverse causality, the association found by our group lead us to hypothesize a beneficial effect of alcoholic beverages consumption on neurological disability.

Although a previous reported association of a higher coffee and fish consumption with a lower progression rate in relapsing onset MS [26], our results did not show any significant association between daily intake of coffee or fish and EDSS.

Two large studies found a high prevalence of ever smoking among MS patients (over 17% current smokers and 29% to 38% former smokers) [9,19]. One of them suggested an adverse effect of smoking in MS progression [9]. In our sample, 7 patients (19.4%) were current smokers and 5 (13.9%) were former smokers. Although the relative frequency of current smokers has been higher comparatively to those studies, we found no significant association between smoking status and EDSS.

Regarding physical activity, a large study reported a predominant sedentary lifestyle among MS patients [19]. In contrast, 25 (71.4%) patients in our study reported moderate or vigorous physical activity. This proportion approaches the results of a survey study applied in 123 women with MS, most of them (85%) ambulatory patients [18]. Therefore, the exclusive inclusion of ambulatory patients in our study may explain the higher level of physical activity. A cross-sectional study had already suggest a positive effect of physical activity on reducing the risk of progression to EDSS 6 in relapsing onset MS [4]. In our study, patients with lower EDSS had a significantly higher physical activity level. We cannot conclude a beneficial effect of physical activity on delaying disability progression since the level of physical activity may be a reflection of functional status. Nevertheless, it is important to take physical activity in concern as a point of complementary intervention in MS patients.

Our study has some limitations. The interpretation of dietary intake results was limited due to the absence of quantitative evaluation. Data that was self-reported in face-to-face interviews may have some inaccuracy related to patient and interviewer subjectivity. Given the small sample size, multivariable adjustment for confounders such as sex, age, years since the

diagnosis and immunomodulatory treatment was not viable. In addition, there were some missing values and we cannot exclude a change in health behaviours of MS patients over time. The main strength of this study is the assessment of dietary intake and body composition in MS patients, since there are few studies reporting that. Moreover, after nutritional evaluation the participants had opportunity to receive counselling on healthy dietary habits and general recommendations for health.

5. Conclusion

Our findings enhance the importance of assessing body composition as part of MS patients' evaluation. We hypothesize that neurological disability leads to deleterious changes in body composition, namely increasing %FBM, which seems to be a better marker for risk of comorbid-health conditions than BMI in these patients. Furthermore, PA appears to have a considerable correlation with neurological disability. However, we cannot conclude that dietary habits have an effective impact on MS course. Large prospective studies are needed to infer causal relationships between specific dietary habits and MS outcomes, as well as to evaluate body composition changes during disease's progression. It is important to clarify how changes in life-style may play a beneficial role on quality of life and MS course.

Conflicts of interest

The authors declare no conflicts of interest.

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Highlights

A high proportion of multiple sclerosis patients exceed body mass index and body composition values recommended for health.

Neurological disability seems to promote deleterious changes in body composition, namely increasing the percentage of fat body mass.

The percentage of fat body mass seems to be a better marker of the risk of comorbid-health conditions than body mass index in these patients.

Phase angle appears to have a considerable correlation with neurological disability.

Agradecimentos:

Em primeiro lugar, deixo o meu sincero agradecimento à Prof.ª Doutora Joana Guimarães e à Professora Doutora Flora Correia pela disponibilidade e pelo papel fundamental na idealização e realização deste trabalho, sempre com uma análise crítica e construtiva sobre o mesmo.

Em seguida, gostaria de agradecer à Dr.ª Cristina Arteiro, Mestre em Nutrição Clínica, Dr.ª Mafalda Quelhas, Dr. Tiago Silva, Dr. Luís Silva, Dr.ª Alexandra Oliveira e Dr.ª Rita Simões, nutricionistas da Unidade de Nutrição e Dietética do Centro Hospital São João (CHSJ) que colaboraram na avaliação nutricional dos participantes neste estudo.

Agradeço também ao Prof. Doutor Rui Poínhos, pelas orientações cruciais na análise estatística e pelo atencioso suporte na revisão dos métodos e resultados.

Finalmente, gostaria de agradecer ao Dr. Pedro Souteiro, médico do CHSJ, pela revisão da linguagem do artigo, à Dr.ª Rita Bettencourt Silva, médica do CHSJ, pela leitura crítica do trabalho ao longo da sua elaboração, e ao colega David Reis, pela ajuda na resolução de algumas questões burocráticas e logísticas.

Anexos

1 – Aprovação da Comissão de Ética para a Saúde e Conselho de Administração do Centro Hospitalar São João

2 – Normas editoriais da revista “Multiple Sclerosis and Related Disorders”

Direcção Clínica
23/9/15

CES 182.15

AUTORIZADO
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Directora Clínica | Enfermeira Directora | Vogal Executivo | Vogal Executivo
(Dra Mamede Soares) | (Enfermeira Eurídice Portela) | (Dr. João Oliveira) | (Dr. Amaro Ferreira)

Exmo. Senhor
Presidente do Conselho de Administração do
Centro Hospitalar de S. João – EPE

Assunto: Pedido de autorização para realização de estudo/projecto de investigação

Nome do Investigador Principal: Beatriz Joana Bettencourt Silva

Título do projecto de investigação: Esclerose Múltipla e Nutrição: Avaliação de doentes com formas progressivas e surto-remissão

Pretendendo realizar no(s) Serviço(s) de Neurologia
do Centro Hospitalar de S. João – EPE o estudo/projecto de investigação em epígrafe, solicito a V. Exa., na qualidade de Investigador/Promotor, autorização para a sua efectivação.
Para o efeito, anexa toda a documentação referida no dossier da Comissão de Ética do Centro Hospitalar de S. João respeitante a estudos/projectos de investigação, à qual endereçou pedido de apreciação e parecer.

Com os melhores cumprimentos.

Porto, 5 / Junho / 2015

O INVESTIGADOR/PROMOTOR

Beatriz Bell. Silva

Comissão de Ética para a Saúde – Centro Hospitalar São João / FMUP

Parecer

Título do Projecto Esclerose Múltipla e Nutrição: Avaliação de doentes com formas progressivas e surto-remissão.

Nome do Investigador Principal: Beatriz Joana Bettencourt Silva

Local onde sera realizado o estudo: Serviço de Neurologia, – CHSJ, havendo autorização da respectiva Diretora de Serviço para a realização do mesmo.

Conclusão de Mestrado Integrado em Medicina

Objectivo do estudo:

- Avaliar do ponto de vista nutricional doentes com EM, formas progressivas e surto-remissão, seguidos na Consulta de Doenças Desmielinizantes, do Serviço de Neurologia do Hospital de São João.

Período previsto de conclusão: não definido

Benefício / Risco: N/A

Respeito pela liberdade e autonomia do sujeito do ensaio: Prevê-se a obtenção do consentimento informado, complementado por um suporte de informação escrita para os participantes, que refere os objectivos do estudo, os riscos/benefícios, bem como a liberdade em participar.

Confidencialidade dos dados: está garantida a confidencialidade dos dados e esta informação será restrita aos investigadores.

A Investigadora Principal dispõe de competência técnica e científica para a realização do estudo.

O estudo prevê a realização de questionários, e foram incluídos um exemplar de cada.

Custos: O estudo não prevê custos acrescidos para a instituição.

Parecer: Em face da análise do protocolo de estudo, proponho a sua aprovação pela CES do CHSJ.

Porto, CHSJ, 30 de Junho de 2015

O Relator

Dr. John Preto

7. SEGURO

a. *Este estudo/projecto de investigação prevê intervenção clínica que implique a existência de um seguro para os participantes?*

SIM ☐ (Se sim, junte, por favor, cópia da Apólice de Seguro respectiva)
NÃO ☐
NÃO APLICÁVEL ☑

8. TERMO DE RESPONSABILIDADE

Eu, Beatriz Joana Bettencourt Silva,
abaixo-assinado, na qualidade de Investigador Principal, declaro por minha honra que as informações prestadas neste questionário são verdadeiras. Mais declaro que, durante o estudo, serão respeitadas as recomendações constantes da Declaração de Helsínquia (com as emendas de Tóquio 1975, Veneza 1983, Hong-Kong 1989, Somerset West 1996 e Edimburgo 2000) e da Organização Mundial da Saúde, no que se refere à experimentação que envolve seres humanos. Aceito, também, a recomendação da CES de que o recrutamento para este estudo se fará junto de doentes que não tenham participado em outro estudo no decurso do actual internamento ou da mesma consulta.

Porto, 5 / Junho / 2015

Beatriz Beth. Silva
O Investigador Principal

PARECER DA COMISSÃO DE ÉTICA PARA A SAÚDE DO CENTRO HOSPITALAR DE S. JOÃO

emitido na reunião plenária da CES de 03 / Julho / 2015

A Comissão de Ética para a Saúde APROVA por unanimidade o parecer do Relator, pelo que nada tem a opor à realização deste projecto de investigação.

Prof. Doutor Filipe Almeida
Presidente da Comissão de Ética

MULTIPLE SCLEROSIS AND RELATED DISORDERS

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Original Research Articles

Full length research papers will not normally be more than 3500 words in length from the Inotrduction through the Discussion section and will preferably be shorter. Submission of a paper to Multiple Sclerosis and Related Disorders will be held to imply that it represents original research not previously published (except in the form of an abstract or preliminary report), that it is not being considered for publication elsewhere, and that if accepted by Multiple Sclerosis and Related Disorders it will not be published elsewhere in the same form in any language without the consent of the Publisher. Major papers of topical content will be given priority in publication.

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Case reports should detail the clinical, laboratory and neuroimaging features of informative patients. Informative patients should provide insights that inform on genetic contributions to disease, rare clinical manifestations, novel laboratory or imaging features, or highlight important concepts in the differential of MS and related disorders. Case reports should be approximately 1200 words, and should have no more than five key references

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The guide, reported here, is intended to act as a checklist to aid both authors and referees of manuscripts, just as the Consolidated Standards of Reporting Trials (CONSORT) guidelines are a compulsory part of reporting clinical trials.

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